

The kinetics of $^1\text{H}/^3\text{H}$ exchange in willow during the vegetation

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Available data on tritium accumulation in plants tissues after accidental release from nuclear facilities are vary and contradictory.

In a greenhouse experiment the peculiarities of tritium migration between the water media of the habitat and tissues of white willow (*Salix alba L.*) during the vegetation have been studied. The rate constant of tritium transfer through the root system to the intracellular sap of plants is $2.17 \pm 1.45 \cdot 10^{-6} \text{ s}^{-1}$. The tritium balance between external water and intracellular sap has been come to the equilibrium during 1-2 weeks (Fig. 1). Thus, the fractionation factor (α) is 0.88–0.94 and does not depend on the concentration of the superheavy isotope of hydrogen in external water. The rate constant of the transformation of tritium in organically bounded species (OBT) is $8.6 \pm 3.0 \cdot 10^{-7} \text{ s}^{-1}$. The equilibrium is set for 4 to 11 weeks, $\alpha = 0.17$ –0.19 and does not depend on the concentration of the superheavy isotope of hydrogen in external water. During the experimental study the extraction of the radioactive isotope from the system, probably owing to transpiration, has been observed. The value of rate constant of Tritium transpiration calculated from experimental data is $2.67 \pm 0.27 \cdot 10^{-8} \text{ s}^{-1}$. The rate of tritium remove owing to transpiration is proportional to it concentration in external water. The factor of tritium fractionation during transpiration is 1.2.

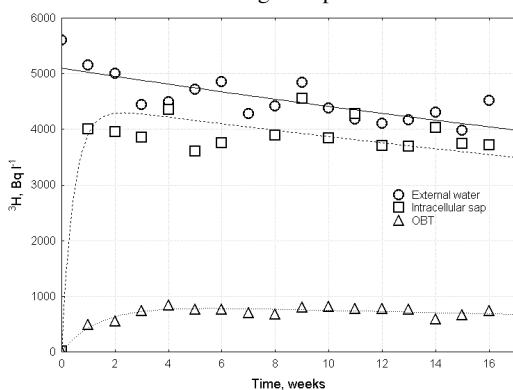


Figure 1: Tritium redistribution during the experiment